

REMARKS

These Remarks are in reply to the Office Action mailed January 11, 2005. Claims 1, 2, 4-9, 11-15, 18-34 and 36-41 were pending in the Application prior to the outstanding Office Action. No claims are presently being amended, canceled or added at this time. Accordingly, claims 1, 2, 4-9, 11-15, 18-34 and 36-41 remain for the Examiner's consideration, with claims 1, 2, 5, 8, 11, 12, 13, 14, 15, 20, 21, 29, 24 and 41 being independent. Reconsideration and withdrawal of the rejections is respectfully requested.

I. SUMMARY OF REJECTIONS

Claims 1, 2, 4-7, 11, 14, 18, 19, 20-30, 32 and 33 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Kawashima (U.S. Patent No. 4,516,991).

Claims 8, 9, 12, 13, 31, 34, and 36-41 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Kawashima (U.S. Patent No. 4,516,991).

II. SUMMARY OF CLAIMED INVENTION

As stated in paragraph [0133] on page 38 of the specification, "[i]n general, the quantity of negative ions generated and emitted by the first (i.e., ion emitter) electrode is proportional to the surface area of the first electrode." As further explained in paragraph [0133], for a given electrode height, the length of a curved or slack wire emitter electrode is greater (e.g., 15-30% greater) than a straight electrode of the same height (i.e., spanning the same distance). In discussing FIG. 13A in paragraph [0133], the specification states that "[t]he greater total length of the [ion emitter] electrode 252 translates to a larger surface area than the [straight] wire-shaped electrodes 232. Thus, the electrodes 252 will generate and emit more ions than the [straight] electrode 232. Ions emitted by the ion emitter electrode array attach to the particulate matter within the airflow. The charged particulate matter is attracted to, and collected by, the oppositely charged second collector plates 242. Since the ion emitter electrodes 252 generate and emit more ions than the previously described [straight] electrodes 232, more particulate matter will be removed from the air."

Paragraph [0135] on page 39 of the specification explains that a coiled ion emitter electrode is also longer than a straight (i.e., taught) electrode, possibly even multiple times longer. In discussing FIG. 13C, in paragraph [0135], it is explained that the ion emitter electrodes 256 "have a larger surface area than the [straight] electrodes 232, and generate and

emit more ions than the [straight] first electrodes 232." For the same reasons just explained above, since the coiled electrodes generate and emit more ions than the straight (i.e., taught) electrodes, more particulate matter should be removed from the air.

III. DISCUSSION OF CLAIMS

Claim 1 requires that "the ion emitter electrode is one of (1) slack, (2) curved, and (3) coiled and spans a distance, and wherein the ion emitter electrode has a length that is at least fifteen percent greater than said distance." In rejecting claim 1, it was asserted in the Office Action that Kawashima discloses that "wire electrodes could be coiled and have a length that is at least 15% greater than the distance between the electrodes 11 and electrodes 20. Kawashima further teaches the wire electrode 20 being about two to three time longer than the distance. (see abstract; Fig. 6 & 9; col. 3, ln. 33-40; col. 7, ln. 54-62)." For at least the following reasons, Applicants respectfully disagree with this assertion.

Fig. 6 of Kawashima is a "circuit diagram showing the connecting relation between ionizing wires, dust collecting panel electrodes and a power source" (see Kawashima, column 3, lines 7-9). In the diagram elements 20 are wire electrodes, which are connected through resistors (R) to a positive terminal 26a of a power source E1. It appears that the Examiner is asserting that the resistor elements (R), which are represented by a sawtooth like shape (), teaches a curved ion emitter electrode. However, one of ordinary skill in the art of electrostatic precipitators or electrical engineering will immediately understand that this is not the case. The sawtooth shapes labeled R in FIG. 6 are simply symbols for resistor elements, as shown, e.g., on page 29 of the Owen Bishop's book "Understanding Electronics, Second Edition" Newnes 2001, shown on the next page of this Reply (or any other basic electrical engineering text book).

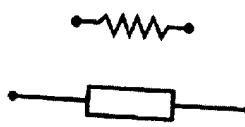
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Resistance 29

The colour codes for tolerance (band T in the figures) are listed in the table.

| Colour | Tolerance (± %) |
|---------|--------------------|
| No band | 20 |
| Silver | 10 |
| Gold | 5 |
| Red | 2 |
| Brown | 1 |
| Green | 0.5 |
| Blue | 0.25 |
| Violet | 0.1 |

These are the symbols that are used to represent resistors in diagrams of electronic circuits.



Accordingly, Fig. 6 of Kawashima does not teach or suggest that the wire electrodes 20 is one of (1) slack, (2) curved, and (3) coiled and spans a distance, and wherein the ion emitter electrode has a length that is at least fifteen percent greater than said distance, as required by claim 1. Rather, Fig. 6 merely shows that the wire electrodes 20 are connected to the power supply (E2) by resistors (R). It is also noted that Fig. 6 (as well as Fig. 9) show the various electrodes as if they are in cross section, or coming out of the page. This can be appreciated from Figs. 2, 4 and 5, which respectively are front, side and back views of the apparatus. As seen in Figs. 2, 4 and 5, the wire electrodes 20 are straight, not slack, curved or coiled.

Fig. 9 merely shows that there can be two groups of wire electrodes, one group 20a can be connected to ground or 0 volts, while the other group 20b can be connected to a positive terminal 32b of the power supply E2.

Column 3, lines 33-40 of Kawashima merely explains that the apparatus includes ionizing and collecting functions. Column 7, lines 54-62 of Kawashima, in explaining Fig. 9, states that certain panel electrodes are omitted, as compared to Figs. 7 and 8, which results in increased airflow rate.

None of the portions of Kawashima pointed out in the Office Action teach or suggest that the wire electrodes 20 of Kawashima are "one of (1) slack, (2) curved, and (3) coiled and spans a distance, and wherein the ion emitter electrode has a length that is at least fifteen percent greater than said distance," as is required by claim 1.

It is noted that Fig. 2, and column 4, lines 23-27 of Kawashima disclose that each wire electrode 20 can have a coil spring 21 elastically extending from the lower portion of the wire, with the springs 21 likely included for the purpose of keeping the wire electrodes 20 tightly between the upper and lower beams of the frame 18, while preventing them from easily snapping. As can be seen from Fig. 2, such coil springs 21 are very small compared to the length of the wire electrodes 20, and thus would clearly not increase the length of the wire electrodes 20 by at least fifteen percent greater than the distance that the wire electrodes 20 span.

For at least the above described reasons, Applicants assert that Kawashima does not teach or suggest the features of claim 1. Accordingly, Applicants respectfully request that the 102(b) rejection of claim 1, and its dependent claims 18 and 22-28 be withdrawn.

Applicants also believe that Kawashima does not render any of the pending claims obvious. When rejecting claims 8-9, 12, 13, 31, 34 and 36-41 under 35 U.S.C. 103(a), the Examiner has cited no case law or MPEP section that states that the Examiner's general assertion that "slight modification of the electrode would have insignificant patentable weight" is sufficient to establish a *prima facie* case of obviousness. Further, the Examiner has not pointed to any suggestion or motivation in the prior art to produce the claimed invention.

It appears that the Examiner may have been alluding to MPEP § 2144.04.IV.B entitled "*Changes in Shapes*" in rejecting the claims as being obvious. For the convenience of the Examiner, MPEP 2144.04.IV.B is shown below.

In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) (The court held that the configuration of the claimed disposable plastic nursing container was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.).

To paraphrase, *In re Dailey* stands for the proposition that changes in shape may be held obvious, absent persuasive evidence that the particular claimed configuration was significant. On the contrary, Applicants assert that they have provided persuasive evidence that the particular claimed configuration of the ion emitter electrode is **significant**, as explained in detail above. More specifically, as explained above, by making the ion emitter electrode slack, curved or coiled, such that it has length that is at least fifteen percent greater than a distance that the

electrode spans, the ion emitter electrodes will generate and emit more ions than a straight electrode spanning the same distance. Since such a slack curved or coiled ion emitter electrode generates more ions than a straight electrode spanning the same distance, more ions will attach to particles, thereby causing more particulate matter to be charged and collected on the collector electrode and thus removed from the air (as was explained in more detail, above).

It is also possible that the Examiner may have been alluding to MPEP § 2144.04.VI.C entitled "**Rearrangement of Parts**" in rejecting the claims. However, as explained in this section of the MPEP "The mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. The **prior art must provide a motivation or reason** for the worker in the art, without the benefit of appellant's specification, to make the necessary changes in the reference device." *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984).

As pointed out by the Federal Circuit in *In re Fritch*, "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992). If the Examiner is to maintain this rejection, Applicants respectfully request that the Examiner point out where the prior art suggests providing an ion emitter electrode this is slack, curved or coiled, such that it has length that is at least fifteen percent greater than a distance that the electrode spans.

Independent claim 2, as amended, states that "said ion emitter electrode is slack and spans a distance, and wherein said ion emitter electrode has a length that is at least fifteen percent greater than said distance." For reasons similar to those discussed above with reference to claim 1, Applicants respectfully assert that claim 2, as well as its dependent claim 4, are patentable.

Independent claim 5 states that "wherein said ion emitter electrode is a coil and spans a distance, and wherein said ion emitter electrode has a length that is at least fifteen percent greater than said distance." For reasons similar to those discussed above with reference to claim 1, Applicants respectfully assert that claim 5, as well as its dependent claims 6 and 7, are patentable.

Independent claim 8 states that "wherein said ion emitter electrode has a plurality of curves and spans a distance, and wherein said ion emitter electrode has a length that is at least fifteen percent greater than said distance." For reasons similar to those discussed above with reference to claim 1, Applicants respectfully assert that claim 8, as well as its dependent claim 9, are patentable.

Independent claim 11 includes "a means for emitting ions having a length that is at least fifteen percent greater than a distance that the means spans." For reasons similar to those explained in detail above, there are significant advantages using a significantly lengthened means for emitting ions, as compared to a shorter means for emitting ions. These include emitting more ions, and enabling more particulate matter to be removed from the air. For at least these reasons, Applicants respectfully assert that claim 11 is patentable.

Independent claim 12 includes an "ion emitter electrode being slack so that its length is at least fifteen percent greater than said distance that said ion emitter electrode spans, in order to enhance emissivity." For reasons similar to those discussed above with reference to claim 1, Applicants respectfully assert that claim 12 is patentable.

Independent claim 13 states that "said ion emitter electrode including a plurality of curves that cause its length to be at least fifteen percent greater than said distance in order to enhance emissivity." For reasons similar to those discussed above with reference to claim 1, Applicants respectfully assert that claim 13 is patentable.

Independent claim 14 states that "said ion emitter electrode being coiled so that its length is at least fifteen percent greater than the distance that said ion emitter electrode spans, in order to enhance emissivity." For reasons similar to those discussed above with reference to claim 1, Applicants respectfully assert that claim 14 is patentable.

Independent claim 15 states includes the step of "providing an ion emitter electrode that is sufficiently slack, curved or coiled such that its length is at least fifteen percent greater than a distance that said ion emitter electrode spans." For reasons similar to those discussed above with

reference to claim 1, Applicants respectfully assert that claim 15, as well as its dependent claims 16 and 19, are patentable.

Independent claim 20 states that "said ion emitter electrode spans a distance, and wherein said ion emitter electrode is sufficiently slack, curved or coiled such that its length is at least fifteen percent greater than said distance." For reasons similar to those discussed above with reference to claim 1, Applicants respectfully assert that claim 20 is patentable.

Independent claim 21 includes "a means for emitting ions having a length that is at least fifteen percent greater than a distance that the means spans". For reasons similar to those discussed above with reference to claims 1 and 11, Applicants respectfully assert that claim 21, as well as its dependent claims 37-39, are patentable.

Independent claim 29 includes "an ion emitter electrode that spans a distance within said housing, said ion emitter electrode created from a wire-shaped element, and formed into a coil-shape such that a length of said electrode is at least fifteen percent greater than said distance." For reasons similar to those discussed above with reference to claim 1, Applicants respectfully assert that claim 29, as well as its dependent claims 30-33, are patentable.

Independent claim 34 includes a "an ion emitter electrode that spans a distance within said housing, said ion emitter electrode created from a wire shaped element, and formed into a curved configuration such that a length of said ion emitter electrode is at least fifteen percent greater than said distance." For reasons similar to those discussed above with reference to claim 1, Applicants respectfully assert that claim 34, as well as its dependent claims 36 and 40, are patentable.

Independent claim 41 states that "said ion emitter electrode has a plurality of curves that cause a length of said ion emitter electrode to be longer than said distance, said plurality of curves being in a same plane, said plane being parallel to said substantially flat surfaces of collector electrodes". None of the prior art references patents discussed above teach or suggest an ion emitter electrode including a plurality of curves being in a same plane that is parallel to the substantially flat surfaces of a pair of collector electrodes.

IV. CONCLUSION

In light of the above, it is respectfully requested that all outstanding rejections be reconsidered and withdrawn. The Examiner is respectfully requested to telephone the undersigned if he can assist in any way in expediting issuance of a patent.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

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